

PRIOR ART
FIG. 1

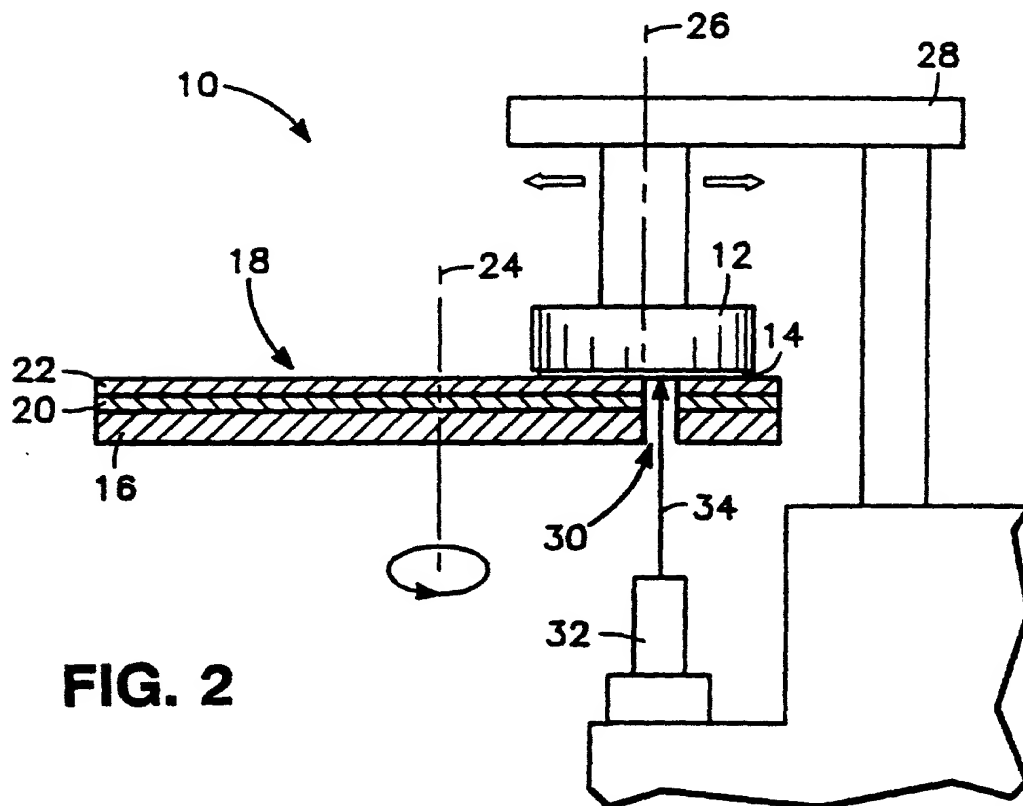


FIG. 2

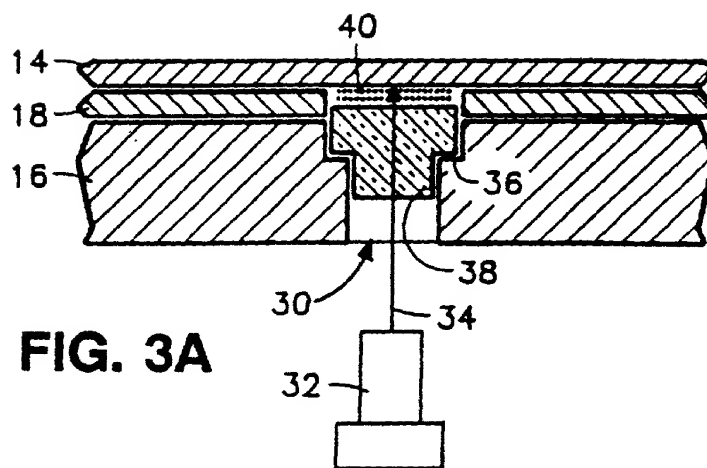


FIG. 3A

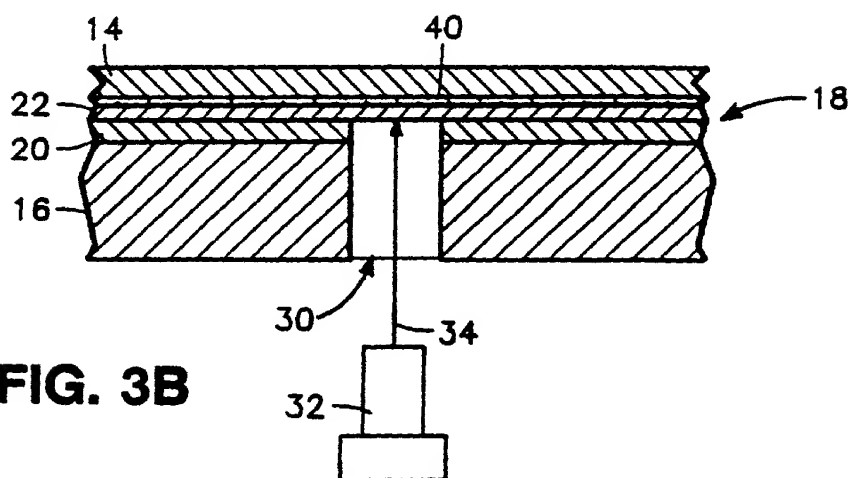


FIG. 3B

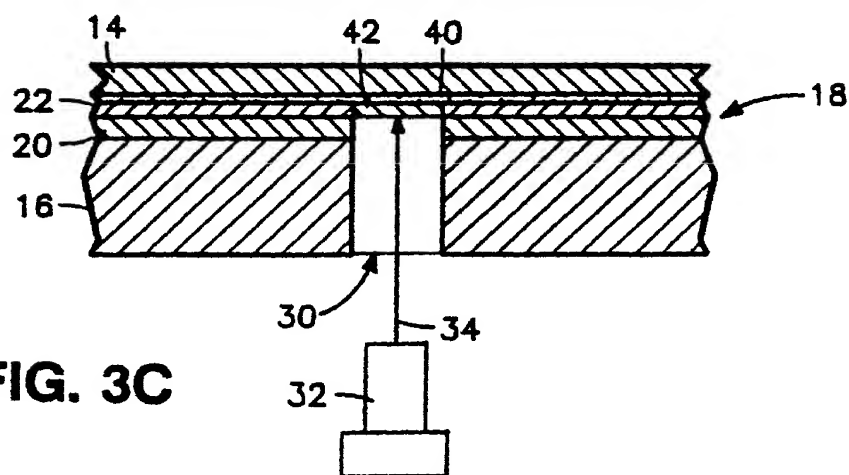


FIG. 3C

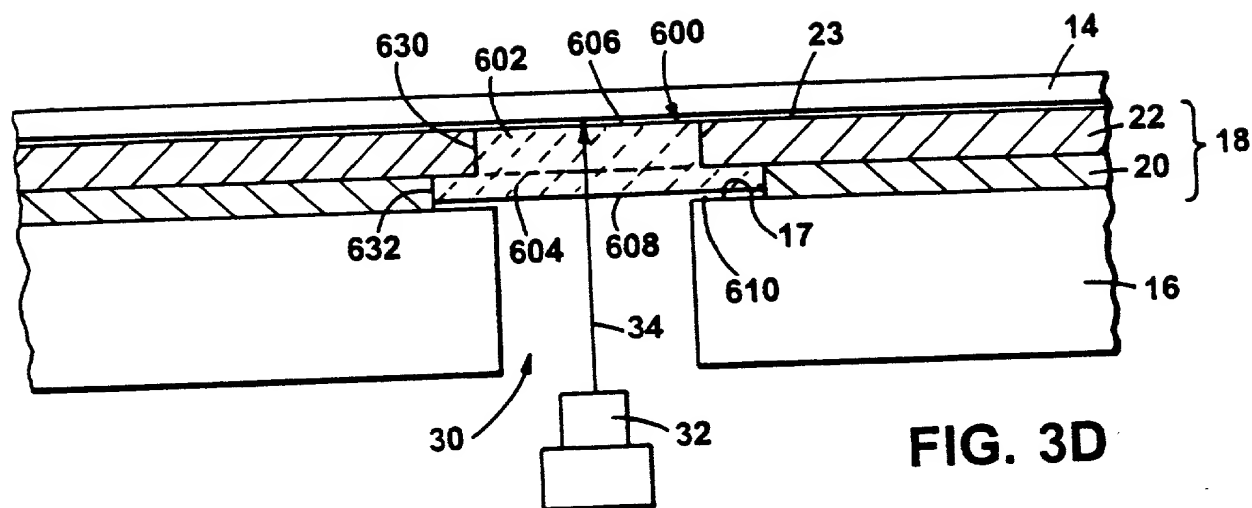


FIG. 3D

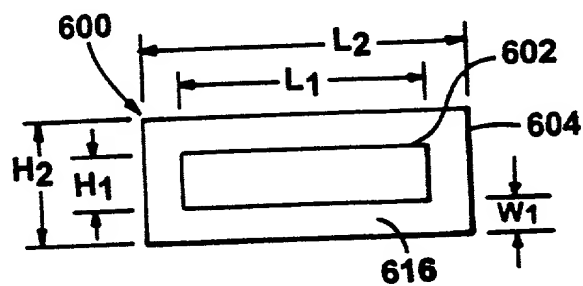


FIG. 3E

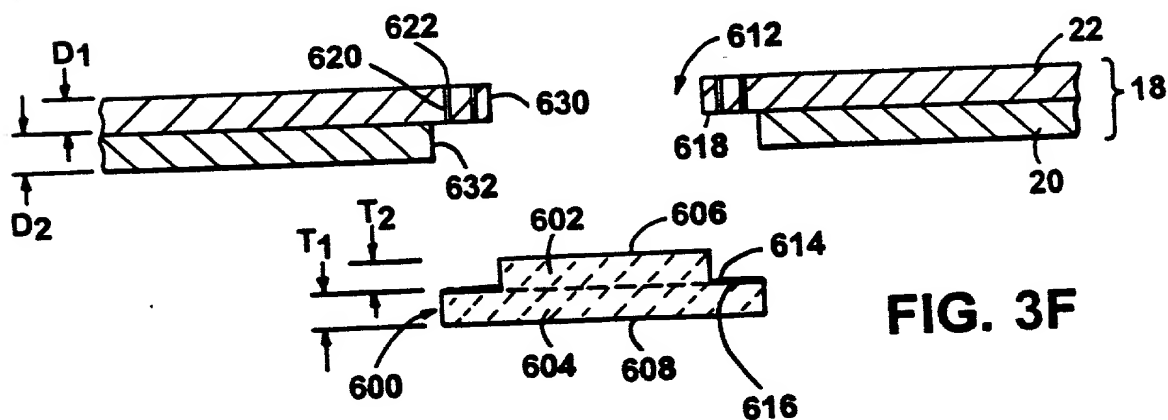
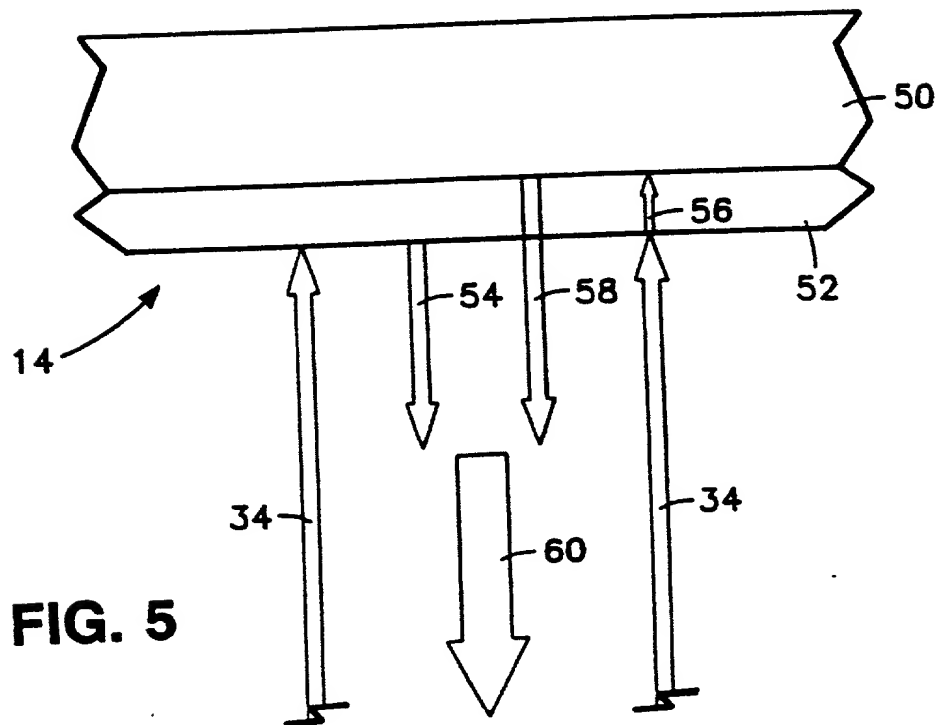
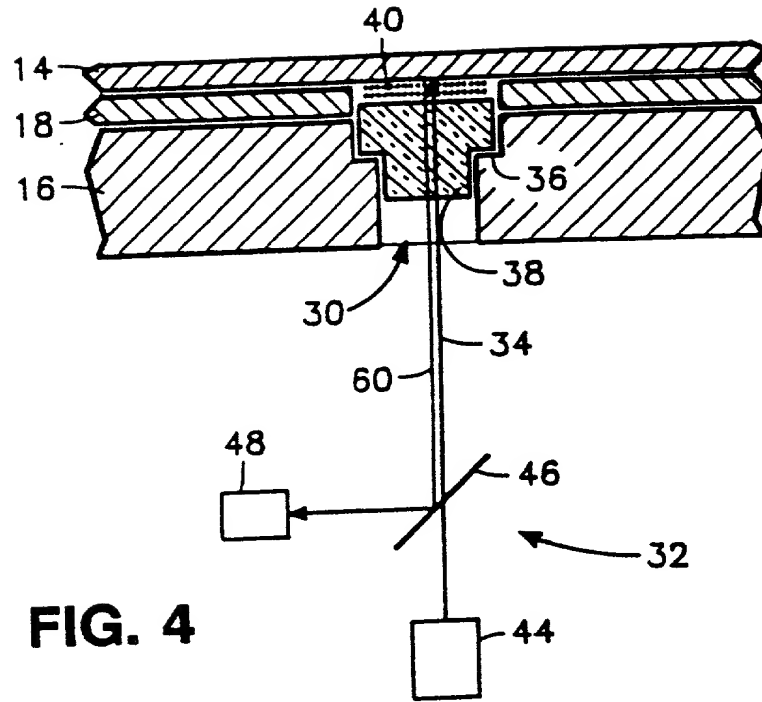


FIG. 3F



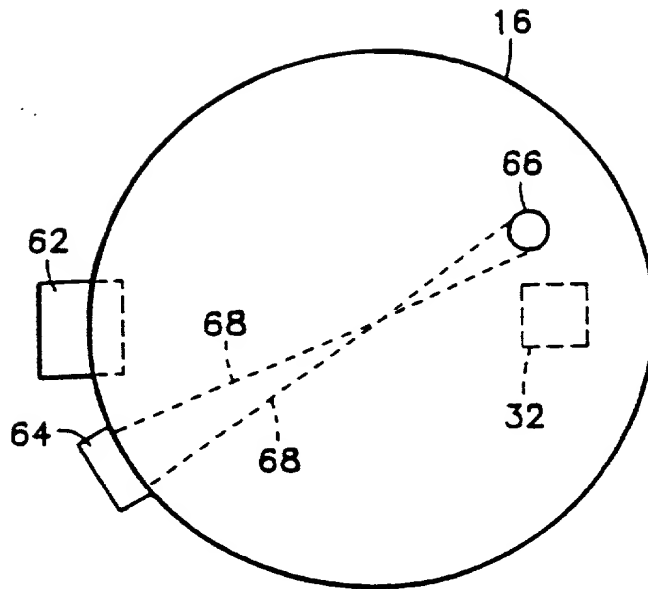


FIG. 6

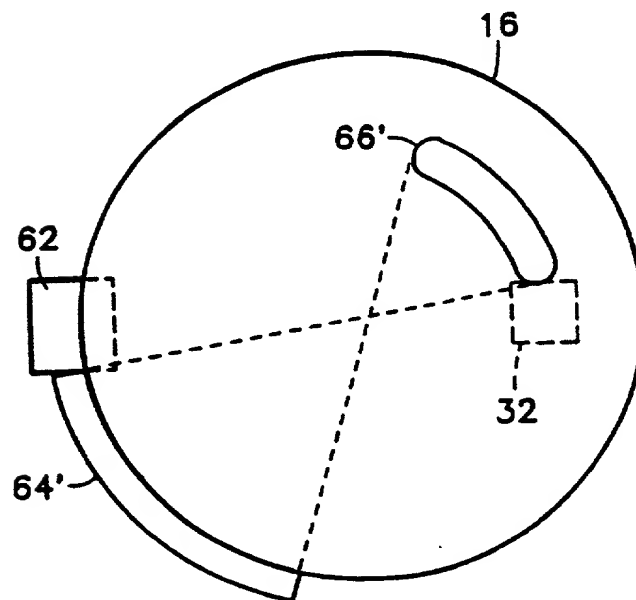
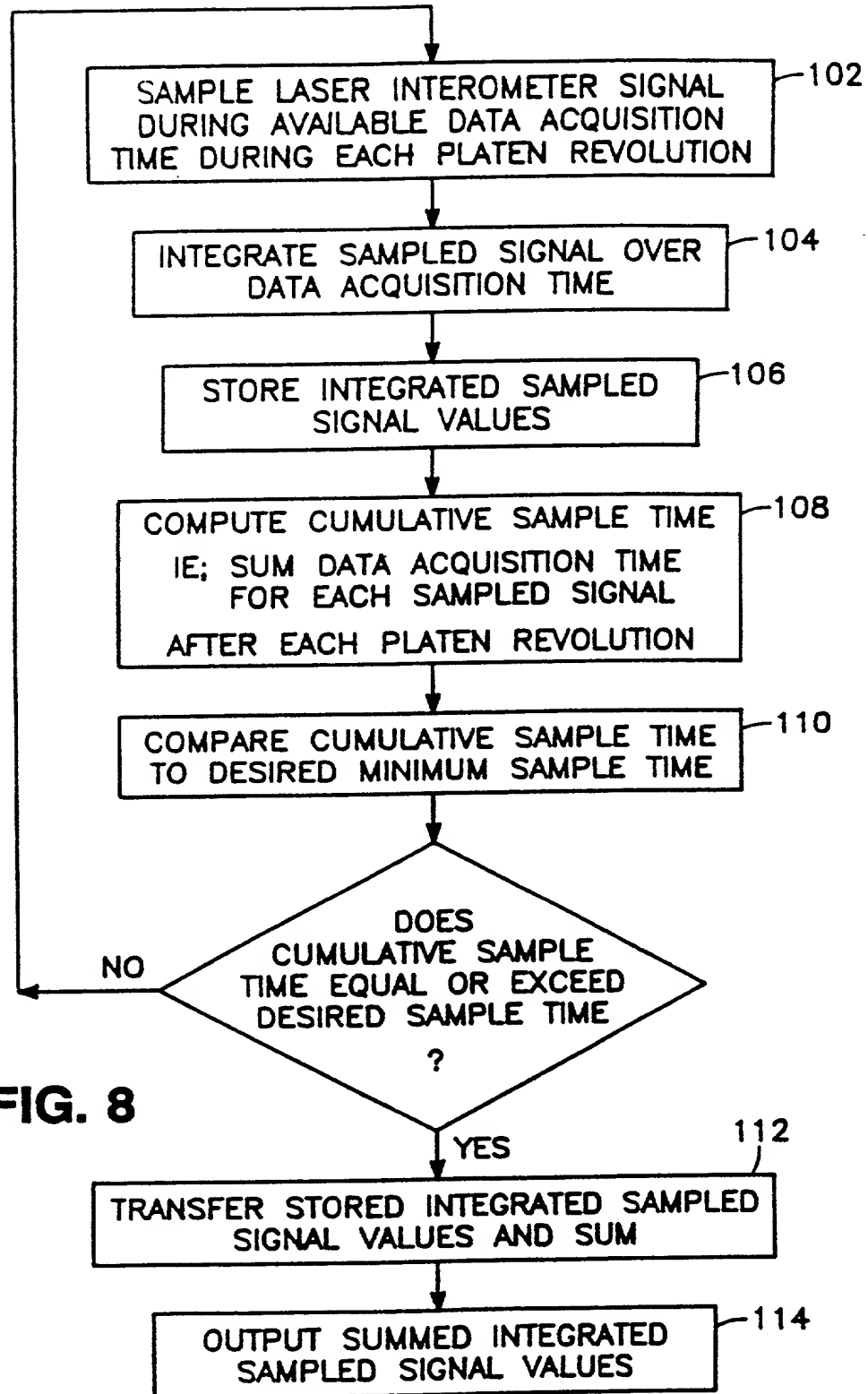


FIG. 7



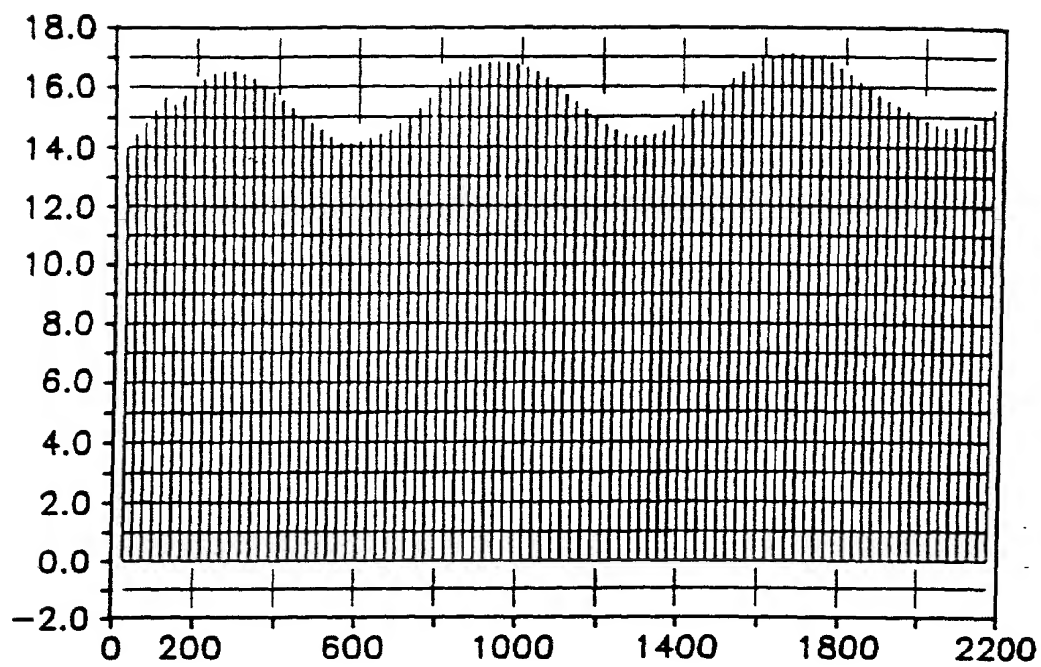


FIG. 9A

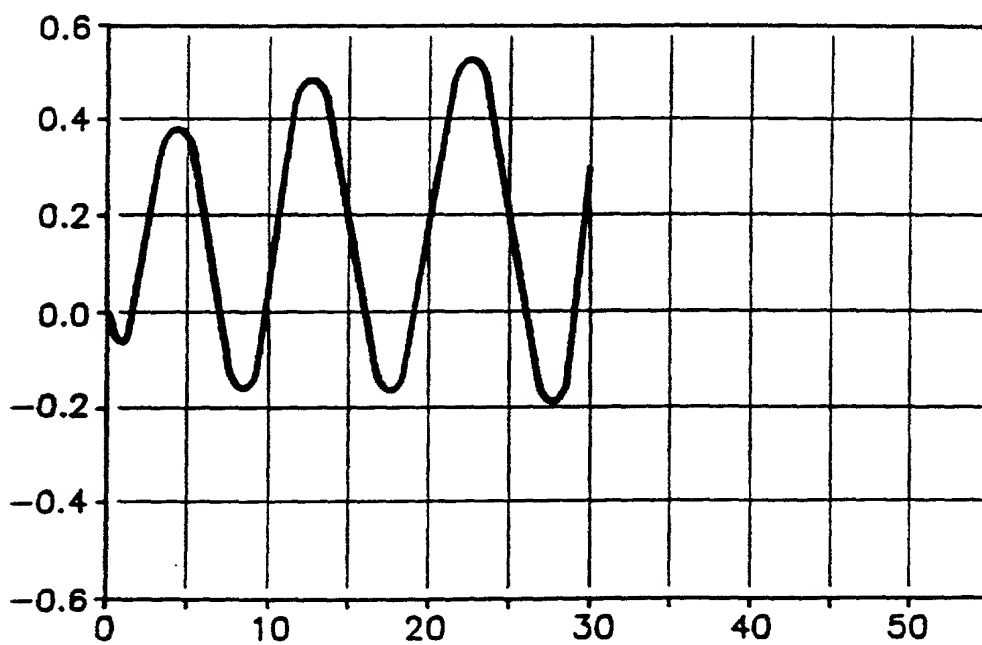


FIG. 9B

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graph TD
    202[COUNT NUMBER OF CYCLES  
(OR PORTION THEREOF)  
IN THE DATA SIGNAL] --> 204[COMPUTE THICKNESS OF OXIDE LAYER REMOVED  
DURING ONE CYCLE (OR PORTION THEREOF)  
OF DATA SIGNAL  
IE;  $\lambda/2n$ ]
    204 --> 206[COMPARE THICKNESS OF OXIDE LAYER REMOVED  
TO THE DESIRED THICKNESS TO BE REMOVED  
IE; NUMBER OF CYCLES (OR PORTION THEREOF)  
x THICKNESS REMOVED DURING ONE CYCLE  
(OR PORTION THEREOF)]
    206 --> 208{DOES  
ACTUAL THICKNESS  
REMOVED EQUAL OR  
EXCEED THE DESIRED  
THICKNESS  
?}
    208 -- NO --> 202
    208 -- YES --> 208[TERMINATE CMP PROCESS]

```

FIG. 10A

MEASURE TIME BETWEEN THE OCCURRENCE
OF A MAXIMA AND MINIMA, OR VISA VERSA,
IN THE DETECTOR SIGNAL

CALCULATE THE REMOVAL RATE BY DIVIDING THE AMOUNT OF MATERIAL REMOVED BY THE MEASURED TIME

ASCERTAIN THE REMAINING REMOVAL THICKNESS
(OR THE CUMULATIVE THICKNESS OF
MATERIAL REMOVED DURING ALL THE
PREVIOUS ITERATIONS IF THIS IS
NOT THE FIRST ITERATION)
BY SUBTRACTING THE THICKNESS OF THE
MATERIAL REMOVED FROM THE DESIRED
THICKNESS TO BE REMOVED

DETERMINE THE REMAINING CMP PROCESS
TIME BY DIVIDING THE REMAINING REMOVAL
THICKNESS BY THE REMOVAL RATE

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graph LR
    A[ ] -- YES --> B[ ]
    A -- NO --> C{WILL THE REMAINING CMP  
PROCESS TIME EXPIRE  
BEFORE THE NEXT  
ITERATION CAN BEGIN?}
    C -- YES --> B
    C -- NO --> D[ ]
    style A fill:none,stroke:none
    style B fill:none,stroke:none
    style D fill:none,stroke:none

```

TERMINATE THE CMP PROCESS AT THE END
OF THE REMAINING PROCESS TIME

FIG. 10B

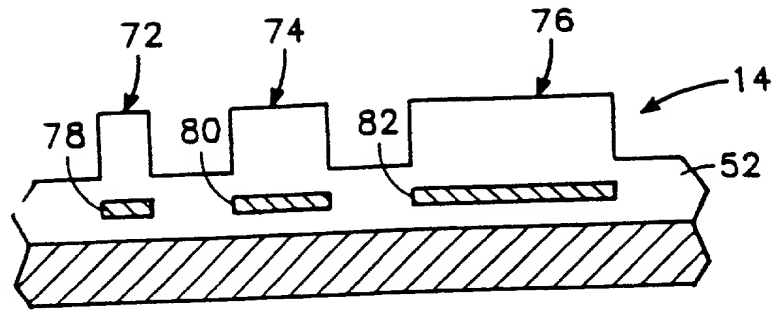


FIG. 11A

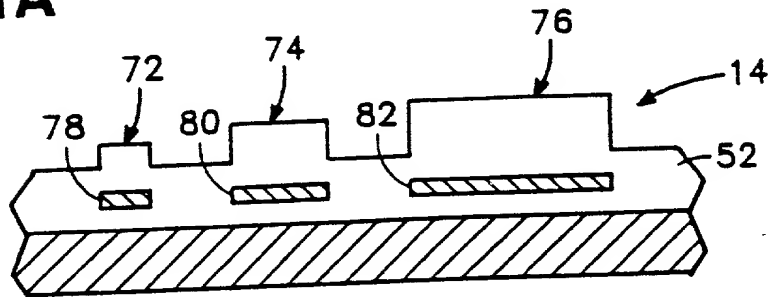


FIG. 11B

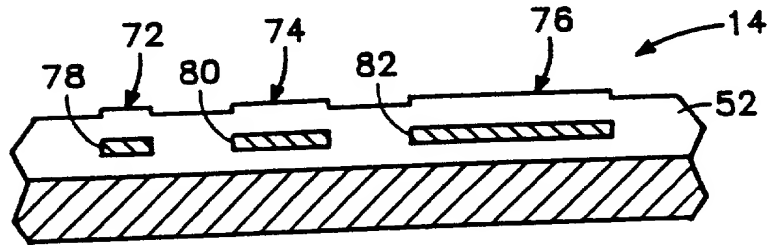


FIG. 11C

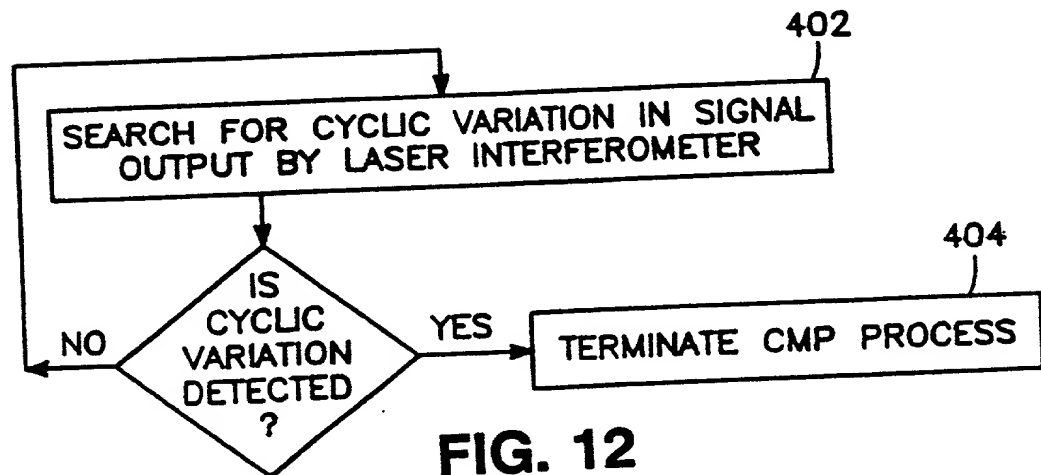


FIG. 12

FIG. 13

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graph TD
    502[502  
FILTER THE DETECTOR SIGNAL TO PASS ONLY THE  
COMPONENT HAVING THE PREDETERMINED FREQUENCY  
ASSOCIATED WITH THE STRUCTURE OF INTEREST] --> 504[504  
MEASURE TIME BETWEEN THE OCCURRENCE OF A MAXIMA  
AND MINIMA, OR VISA VERSA, IN THE DETECTOR SIGNAL]
    504 --> 506[506  
COMPUTE THICKNESS OF OXIDE LAYER REMOVED]
    506 --> 508[508  
CALCULATE THE REMOVAL RATE BY DIVIDING THE AMOUNT  
OF MATERIAL REMOVED BY THE MEASURED TIME]
    508 --> 510[510  
ASCERTAIN THE REMAINING REMOVAL THICKNESS  
(OR THE CUMULATIVE THICKNESS OF MATERIAL  
REMOVED DURING ALL THE PREVIOUS ITERATIONS  
IF THIS IS NOT THE FIRST ITERATION)  
BY SUBTRACTING THE THICKNESS OF THE  
MATERIAL REMOVED FROM THE DESIRED  
THICKNESS TO BE REMOVED]
    510 --> 512[512  
DETERMINE THE REMAINING CMP PROCESS  
TIME BY DIVIDING THE REMAINING REMOVAL  
THICKNESS BY THE REMOVAL RATE]
    512 --> 514{514  
WILL  
THE REMAINING CMP  
PROCESS TIME EXPIRE  
BEFORE THE NEXT  
ITERATION  
CAN BEGIN  
?}
    514 -- NO --> 502
    514 -- YES --> 516[516  
TERMINATE THE CMP PROCESS AT THE END  
OF THE REMAINING PROCESS TIME]
  
```

FIG. 14

FIG. 14

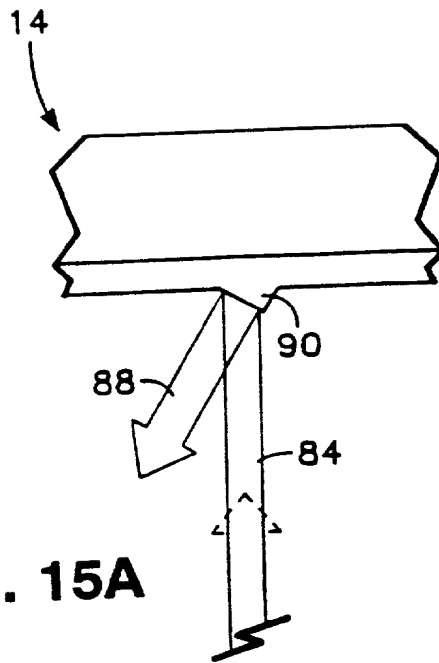


FIG. 15A

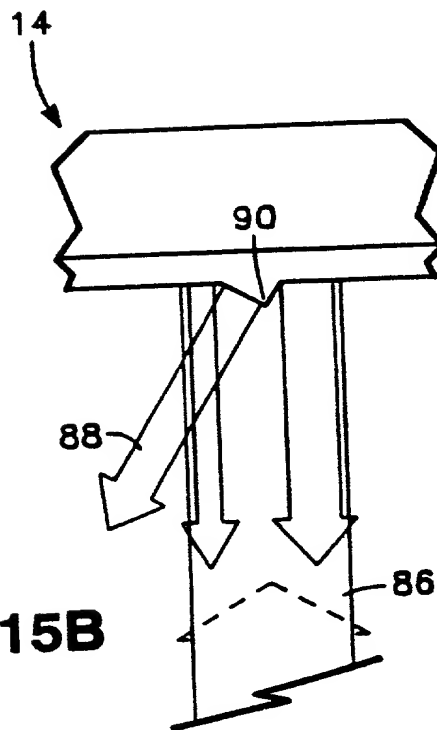


FIG. 15B

Patented Oct 12, 1994

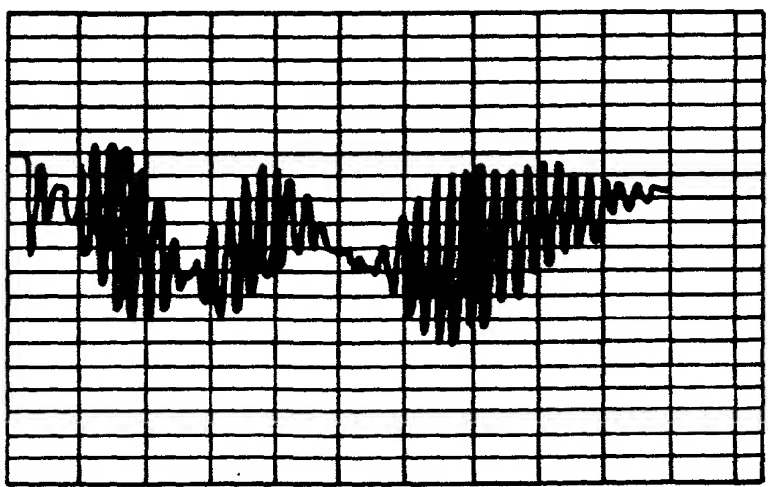
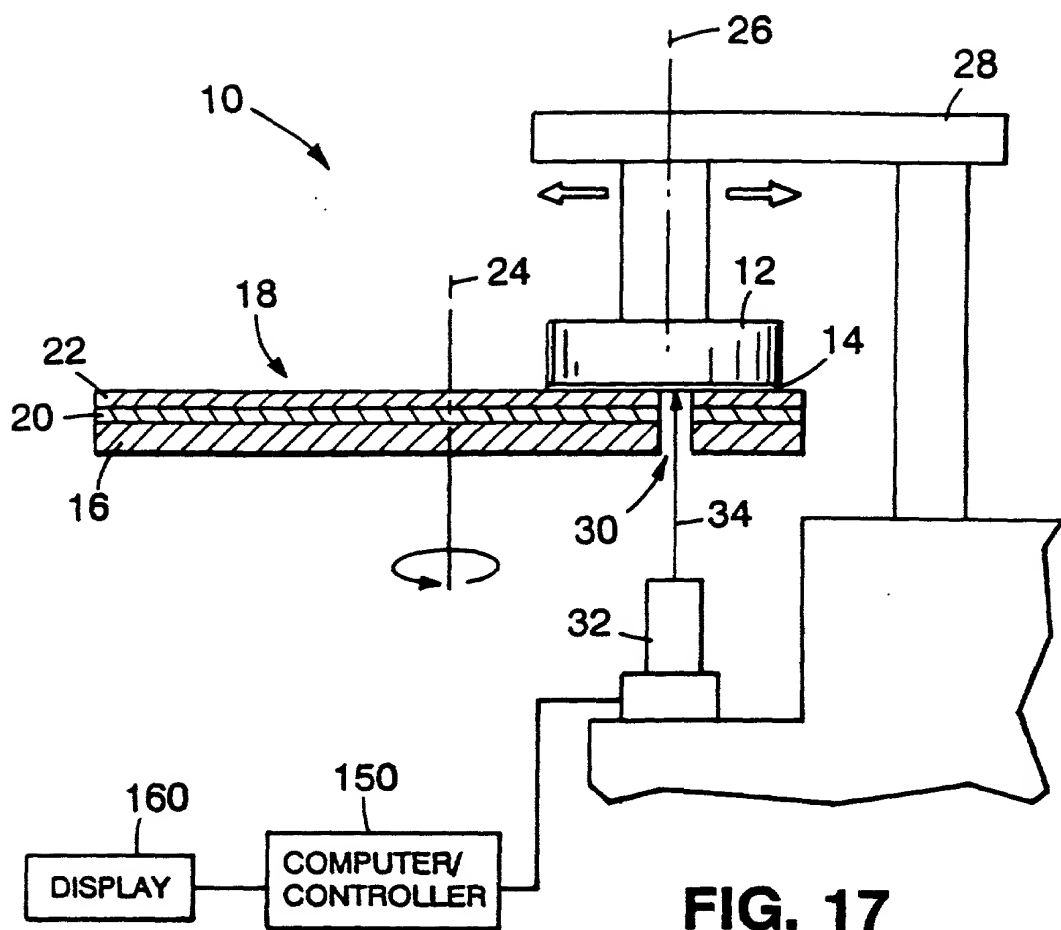


FIG. 16

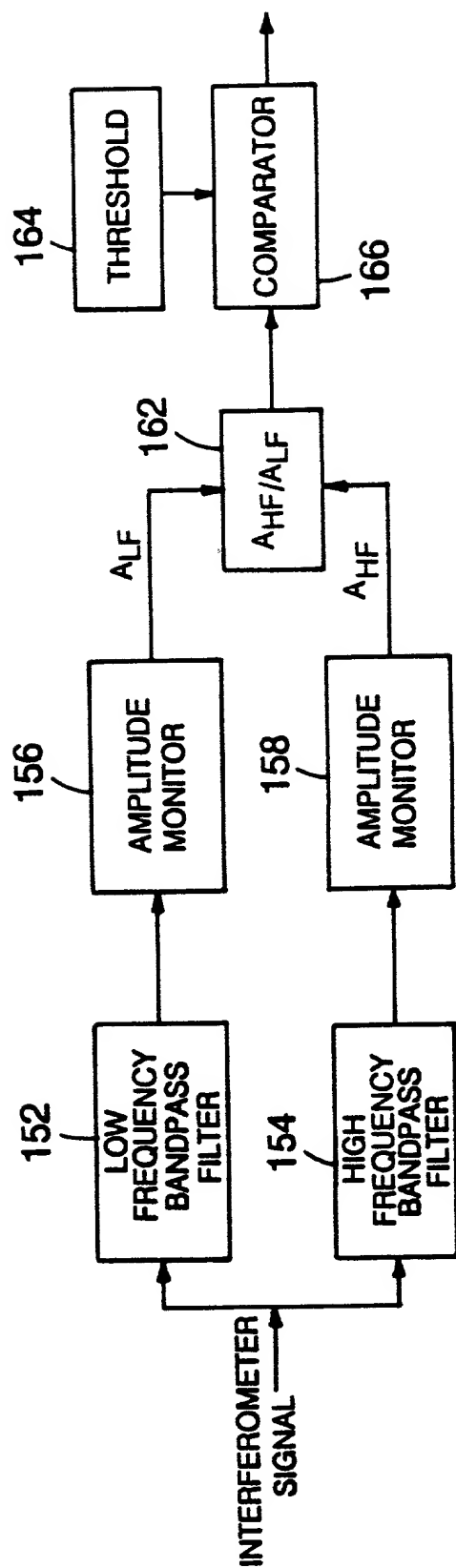


FIG. 18

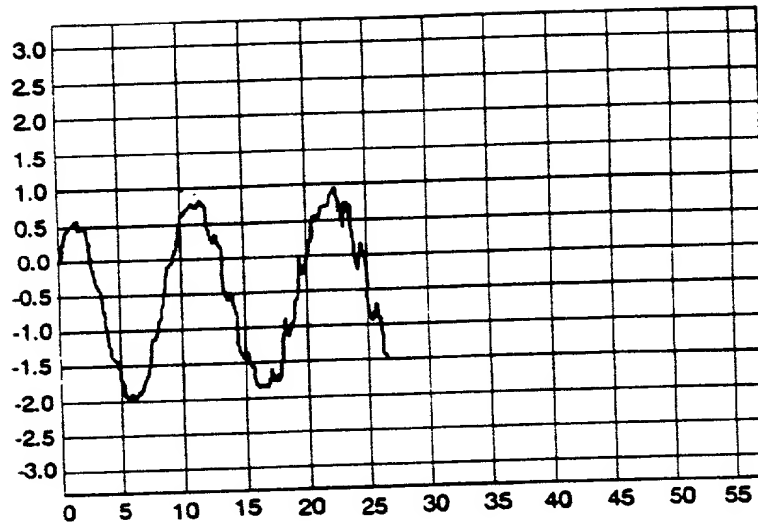


FIG. 19A

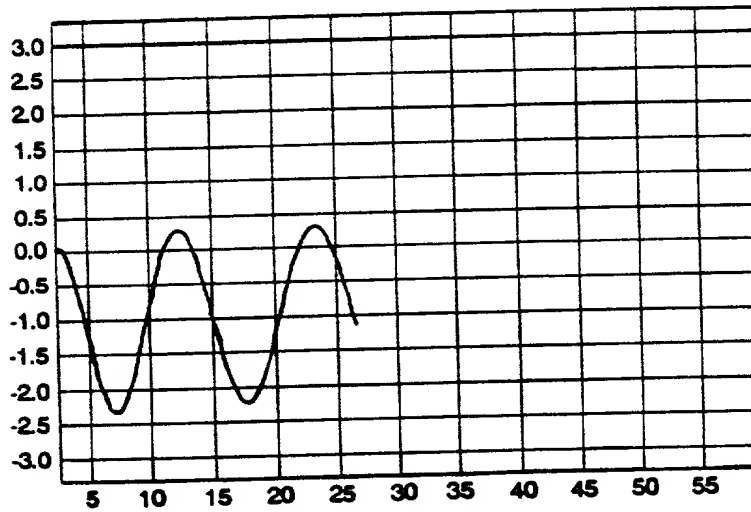


FIG. 19B

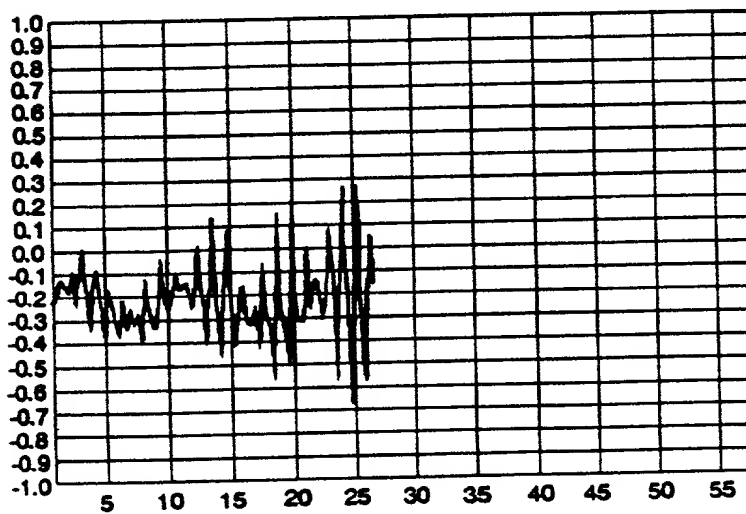


FIG. 19C

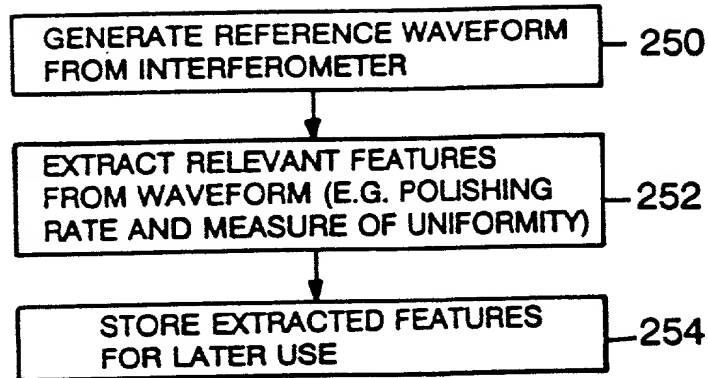


FIG. 20A

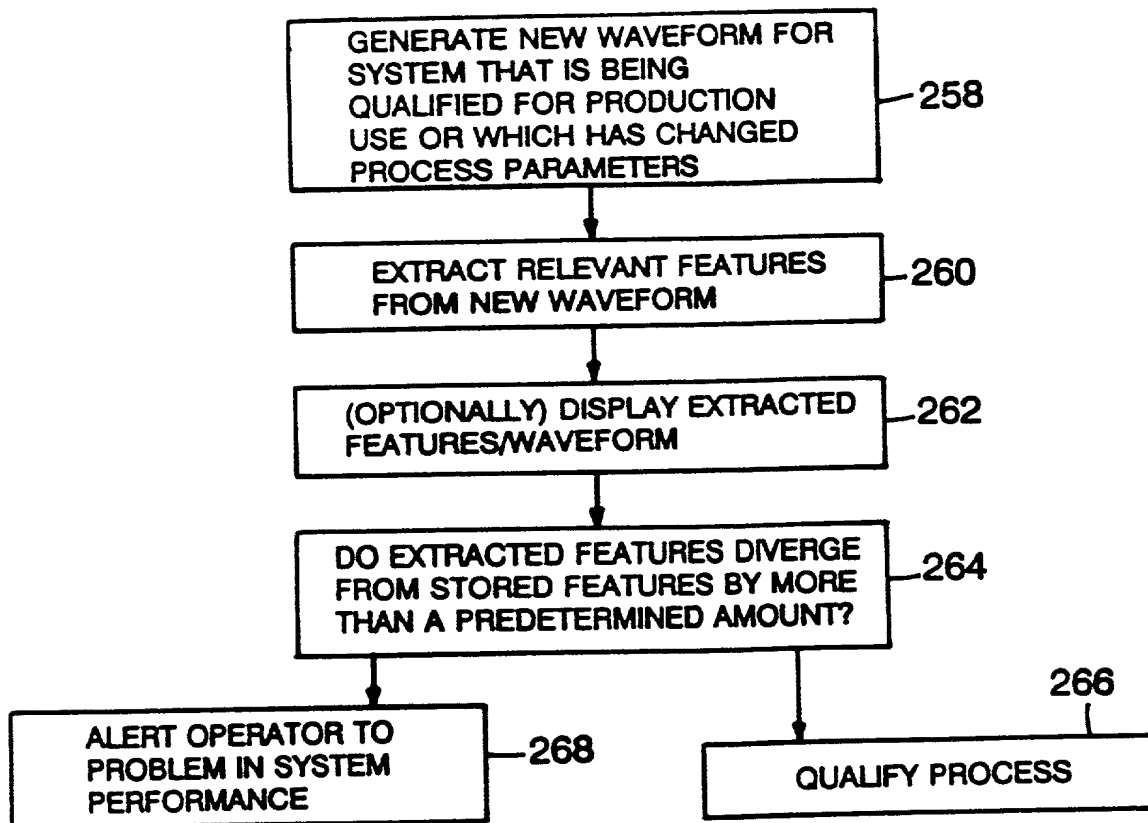


FIG. 20B

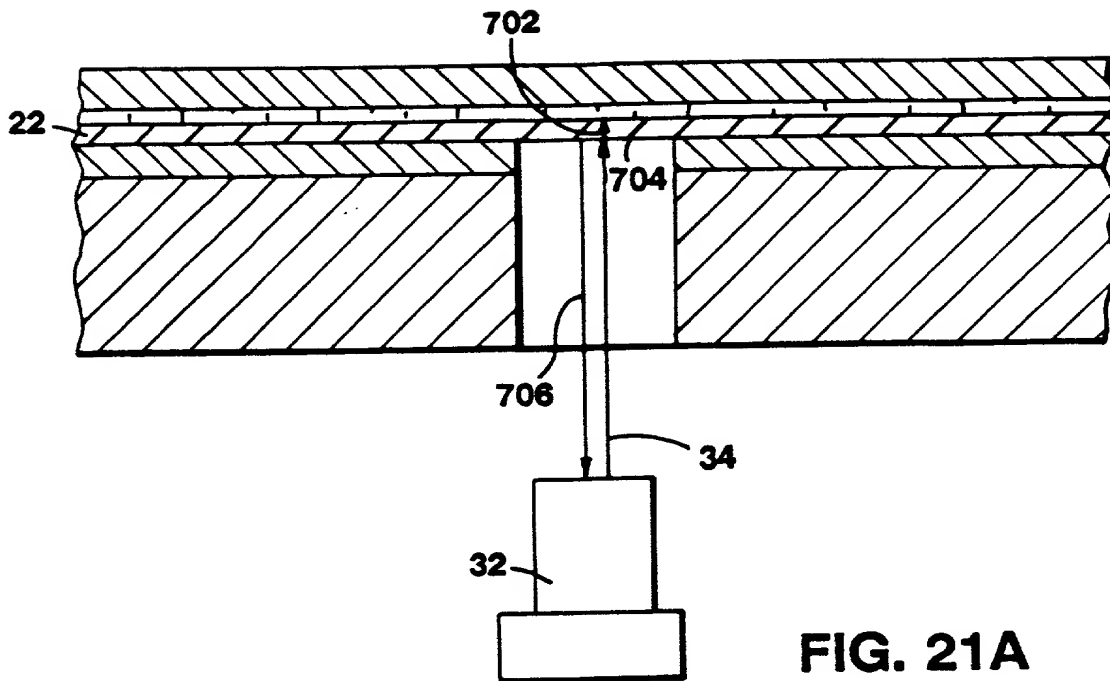


FIG. 21A

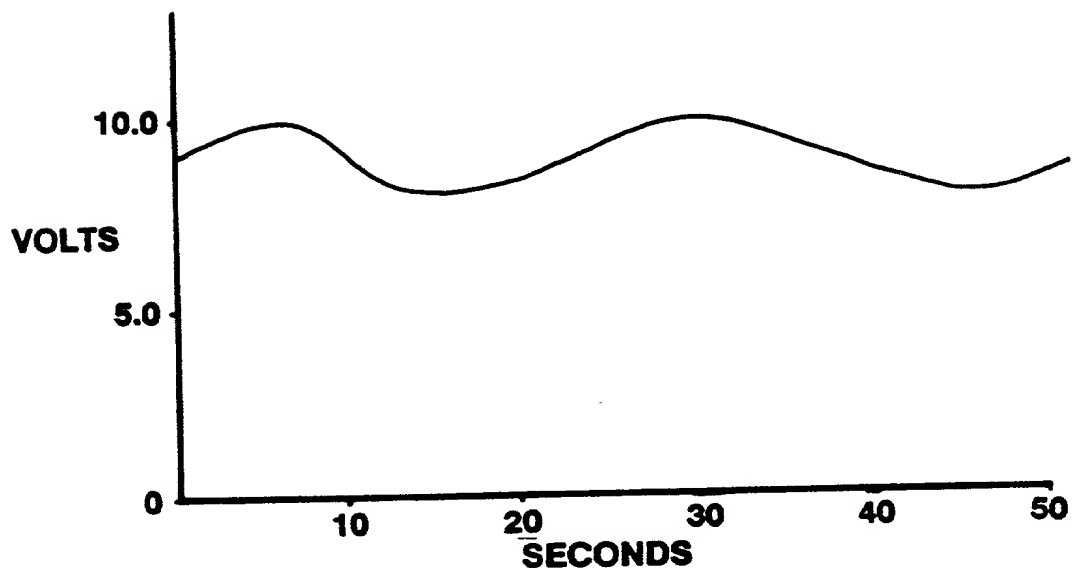


FIG. 21B

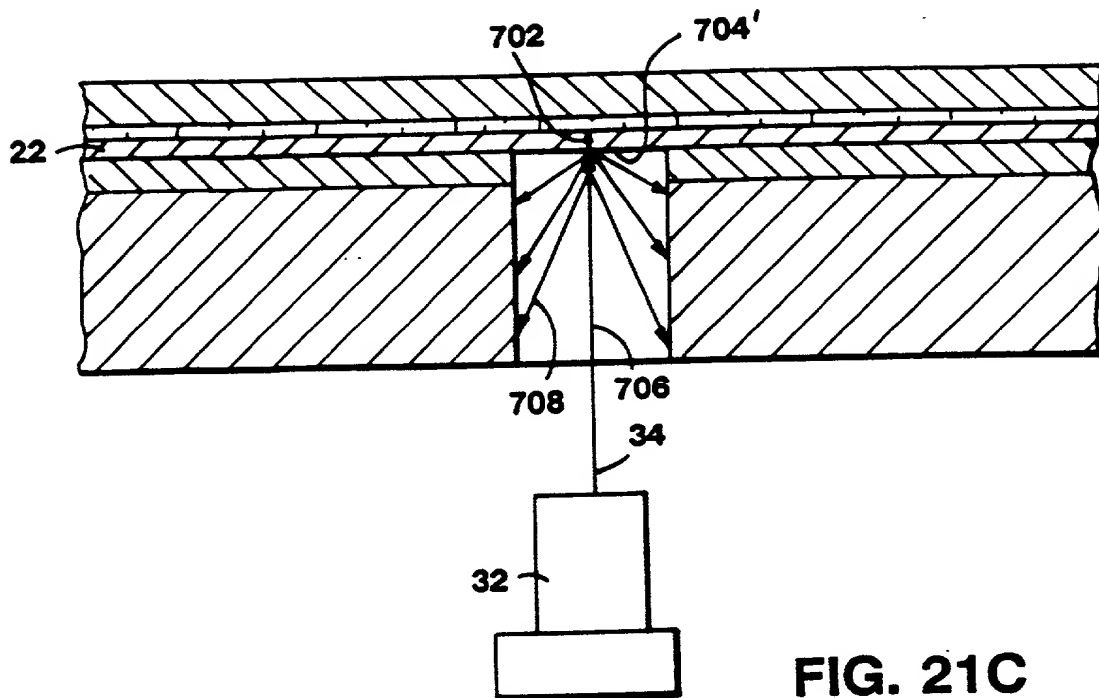


FIG. 21C

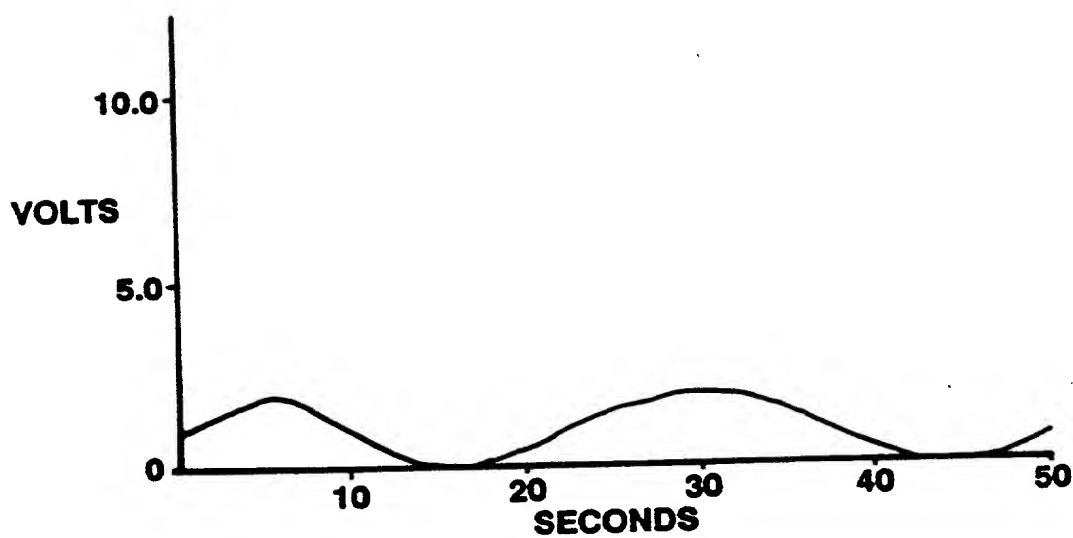


FIG. 21D